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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,879	01/21/2005	Fabrice Pardo	REG-37392	6163

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EXAMINER	
INGHAM, JOHN C	
ART UNIT	PAPER NUMBER
2814	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/521,879	PARDO ET AL.	
	Examiner	Art Unit	
	JOHN C. INGHAM	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 12-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 12-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. PCT/FR03/02343.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4 February 2008 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims **1-3, 9-10, and 12-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Strittmatter (High-Frequency, Long Wavelength Resonant-Cavity-Enhanced InGaAs MSM Photodetectors) and Itatani (US 5,945,720).

5. Regarding claims **1-3, 9-10, and 12**, Strittmatter discloses in Fig 1 an MSM type photo-detection device (Introduction) designed to detect incident light and comprising reflecting means (DBR layer InGaAlAs:Fe/InAlAs:Fe) superposed on a first face of a support (substrate) to form a first mirror for a Fabry-pérot type resonant cavity (Introduction), a layer of material that does not absorb said light (InAlAs), an active layer (absorbing layer) made of a semiconducting material (InGaAs:Fe) absorbing incident light and a network of polarization electrodes (interdigitated Pt/Au electrodes) collecting the detected signal, the electrodes network being arranged on the active layer, the electrodes network being composed of parallel conducting stripes at a uniform spacing (1.0μm), the electrodes network forming a second mirror for the resonant cavity (Introduction), wherein the light to be detected is incident onto the device through the electrodes network (Fig 4 dashed line, frontside illumination), the optical characteristics of this second mirror being determined by the geometric dimensions of said conducting strips, the distance separating the first mirror from the second mirror being determined to obtain a Fabry-perot type resonance (phase-matching between bottom mirror and metal electrodes, pg 146) for incident light between these two mirrors. Strittmatter does

not specify that the period of the electrodes is less than the wavelength of incident light (1.31μm). Instead, Strittmatter discloses a period of 1.8μm.

Itatani teaches that the smaller the width of the window between electrodes, the faster the operating speed of a photodetecting device (col 1 ln 45-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Itatani in the device of Strittmatter in order to increase the speed of the photodetector.

6. Regarding claims **13 and 14**, Strittmatter discloses in Fig 1 the photo-detection device according to claim 1 wherein a passive layer of silicon nitride is deposited on the electrode network.

7. Regarding claim **15**, Strittmatter discloses the device of claim 1, but does not specify wherein a second face of the support has an electrode to apply an electrical field to the device the change the resonant wavelength of the resonant cavity by the opto-electric effect.

Itatani discloses in Fig 7 wherein the support of the Fabry-Perot resonator structure has an additional control electrode (12) that allows the optical properties (absorption coefficient, refractive index) to be varied (col 10 ln 32-40). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Itatani on the device of Strittmatter in order to allow control of optical properties. Placement of the extra electrode on the top or bottom face of the support substrate would be an obvious design choice.

8. Claims **4-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Strittmatter, Itatani and Brown (US 5,663,639). Strittmatter and Itatani disclose the photo-detection device according to claim 1, but fail to specify wherein the reflecting means forming a first mirror are composed of a silver, gold, or aluminum layer, or a multilayer dielectric. Instead Strittmatter discloses a Bragg mirror (DBR) of AlAs and AlGaAs.

Brown teaches in Fig 4 that a metallization layer (17) of gold may be used as a bottom reflecting layer in order to improve reflect photons and serve as a heat sink (col 7 ln 30-37). Brown also teaches in Fig 5 that instead of the metallic layer, a multilayer dielectric mirror (202) of AlAs and AlGaAs may be used, also to reflect photons and improve the conversion efficiency (col 7 ln 49-53). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Brown on the device of Strittmatter and Itatani in order to improve the conversion efficiency of the photo-detection device.

9. Claims **7-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Strittmatter, Itatani and Henning (US 6,528,827). Strittmatter and Itatani disclose the photo-detection device of claim 1, but fail to specify wherein the layer of material that does not absorb light is made of $Al_xGa_{1-x}As$, wherein x is of the order of 0.35, and the active layer is made of GaAs.

Henning teaches in Fig 6 that GaAs is typically used for active layers (104) to absorb light (col 4 ln 33), and layers of AlGaAs (106) with aluminum concentrations around 0.3 (col ln 4 ln 32) are used as transparent wide band-gap layers (col 2 ln 20-24)

and buffers between high concentration layers and absorption layers (col 4 ln 33). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Henning on the device of Strittmatter and Itatani, providing a conventional GaAs absorbing (active) layer and a transparent wide band-gap layer of AlGaAs, functioning as a buffer between the DBR and absorbing layer while at the same time remaining transparent to light.

Response to Arguments

10. Applicant's arguments filed 1 August 2007 have been fully considered but they are not persuasive.

11. Regarding the argument that Strittmatter does not teach that light to be detected is incident onto the device through the electrodes network, Strittmatter shows in Fig 4 that light is incident through the front (through the electrodes). Strittmatter further teaches that the front side of the device may contain a Si/SiN layer sequence, which forms the top mirror of the device (page 146, ln 11, ln 35), and that this mirror is removed (pg 147 ln 24) when the device is illuminated from the front.

12. Regarding the argument that Strittmatter discloses a loss of response when the device is illuminated from the top (shown in Fig 4, dotted line vs solid line), disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. In re Susi, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). "A known or obvious composition does not become patentable simply

because it has been described as somewhat inferior to some other product for the same use." In re Gurley, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994).

13. Regarding the argument on page 6 that Itatani would motivate reducing the space between electrodes and illuminating the device from the rear, Itatani teaches that space between electrodes is reduced and that light is incident onto the electrodes, in similar fashion to the arrangement disclosed by Strittmatter.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Allam (US 5,512,763) teaches reducing electrode spacing on MSM photodetectors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN C. INGHAM whose telephone number is (571)272-8793. The examiner can normally be reached on M-F, 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Howard Weiss/
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